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Meat Inspection Division • Agricultural Research Service • U.S. Department of Agriculture

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SUBJECT: Plastics for Construction of Meat Handling Equipment

In recent years, various plastics have been proposed for fabricating meat packing plant equipment. The proponents usually wish to substitute a plastic material for metal. Many plastics have been accepted by the Meat Inspection Division. Some have proved entirely satisfactory; others have exhibited serious deficiencies when subjected to reasonable-use tests.

With few exceptions (some of which will be specifically mentioned later), good quality, smooth-surfaced stainless steel (300 series), is the best readily available material for fabricating food handling equipment. It is durable, highly rust-resistant, nonporous, and resistant to most agents encountered in food handling plants. It can be kept clean with minimum effort. Some plastics have most of these qualities, but seldom match the durability of stainless steel.

In Federally inspected establishments, plastics are not acceptable for any use where they come in contact with edible meat products unless they are nontoxic (this means pigments, curing agents, catalysts, etc., as well as the basic resin), and unless they do not contain constituents that may migrate in appreciable amount to product contacted.

Plastics are often reinforced with fiberglass for added strength. This may be in the form of woven fiberglass cloth, fiberglass matting, or so-called random or chopped glass fibers mixed with liquid resin and poured or sprayed into a mold or form.

The woven type reinforcement is probably superior to the others. Matting is satisfactory in most cases when properly used. Random fiberglass reinforcement of plastics generally is not suitable for meat handling equipment because the fibers may appear anywhere in the plastic. When they occur at the surface there is a definite hazard of food product contamination. In random reinforcement, therefore, it is important that the fiberglass be deeply embedded in the resin to prevent exposure and detachment of the glass fibers when the equipment is subjected to severe abrasion.

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Gelcoat surfaces (separate coats of resinous substances applied to give a smooth hard finish) over plastic material, whether fiberglass reinforced or not, are not recommended. Such coats often are easily fractured and detached by sharp blows and abrasion.

To get approval for a plastic substance, the first step is to submit a small, representative piece of the plastic to the Chemical Control and Evaluation office of the Meat Inspection Division, with a detailed description of its chemical formula. This is not always easy. Frequently, a fabricator of plastic equipment purchases the plastics from a manufacturer who is reluctant to divulge the formula. These manufacturers usually are willing to furnish the needed data directly to the Chemical Control and Evaluation office of the Division in Washington. (Generally, manufacturers' brochures distributed to customers do not offer sufficient information on the composition of the material to allow evaluation for chemical safety.) The exact proposed use must also be described.

If the plastic is chemically acceptable and appears to have physical qualities (smooth, hard, heat resistant, shatterproof, resistant to abrasion, etc.) suitable for the intended use, the Division allows a trial use. Equipment constructed of the plastic may be tested in one or more Federally inspected meat packing plants. The equipment manufacturer is responsible for making arrangements with plants for such tests and for notifying the Division what plants are involved.

The Meat Inspection Division instructs its inspectors in the area concerning the test. They report their findings after a reasonable period of observation under actual plant conditions. Final decision on acceptability depends largely upon this on-site review and evaluation.

Examples of acceptable and widely used plastic equipment are tote boxes, curing containers, brine and vinegar pumps and pipelines, meat cutting boards, conveyor belts, hand tool handles, and meat-hanging loops. A few plastics that have high resistance to heat and unusually good abrasion resistance are especially desirable for use as scraper blades in meat choppers and cooking kettles and are superior to any metal for such purposes. Teflon plastic, which requires no lubrication, is highly recommended for bearings in trolley or truck wheels and for piston rings in air compressors.

Because of the nature of the abrasion involved, plastics have not yet been accepted for meat trucks or similar equipment from which meats are removed manually with hand tools, such as forks or shovels.

